Small Business Innovation Research/Small Business Tech Transfer

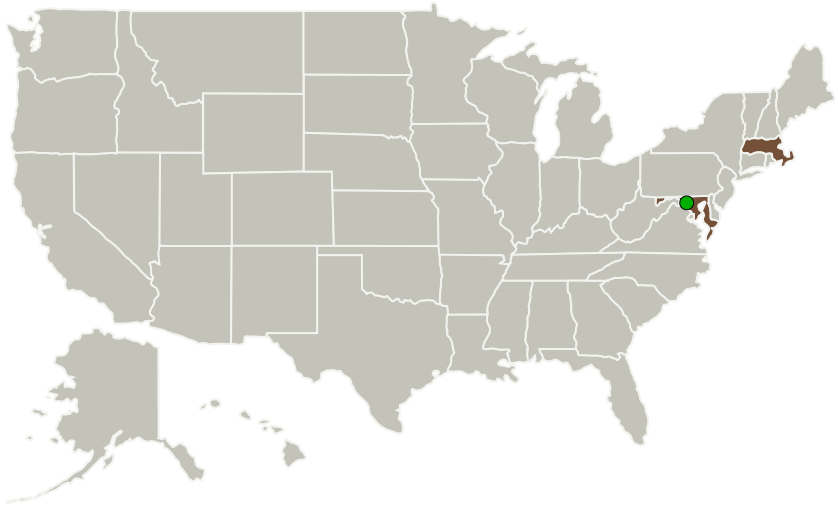
On-Chip hyperspetral imaging system for portable IR spectroscopy Applications, Phase I

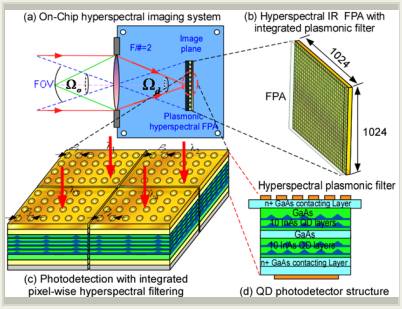
Completed Technology Project (2014 - 2014)

Project Introduction

Hyperspectral middlewave infrared and longwave infrared (MWIR/LWIR) imaging systems capable of obtaining hundreds of narrow band (10-15 nm) spectral information of Earth's surface, the atmosphere, and land use in agriculture are of great importance in NASA's Earth remote sensing missions. Existing hyperspectral MWIR/LWIR imaging systems are bulky and heavy and thus not suitable for portable and small satellite applications. This SBIR project aims to develop an on-chip hyerspectral imaging system with integrated narrow-band (15 nm) hyperspectral filers on the pixels of the MWIR/LWIR image array. Successfully developing the proposed innovation will provide an enabling ultra-compact on-chip hyperspectral imaging technology with significantly reduced size, weight, and power consumption suitable for NASA's portable and small satellite earth remote sensing missions. In phase I, the proposed on-chip hyperspctral imaging system will be evaluated and compared with existing technologies. A preliminary MWIR/LWIR photodetector with the integrated plasmonic narrow-band filter will be fabricated and characterized. In Phase II, a prototype of the miniature on-chip mega pixel (1024x1024) MWIR/LWIR hyperspectral imaging system will be developed for laboratory demonstration.

Primary U.S. Work Locations and Key Partners





On-Chip hyperspetral imaging system for portable IR spectroscopy applications Project Image

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Organizations Performing Work	Role	Type	Location
Applied NanoFemto Technologies, LLC	Lead Organization	Industry	Lowell, Massachusetts
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Transitions

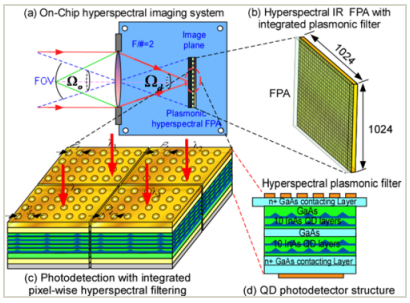
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137425)*

Images



Project Image

On-Chip hyperspetral imaging system for portable IR spectroscopy applications Project Image *(https://techport.nasa.gov/image/136116)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Applied NanoFemto Technologies, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

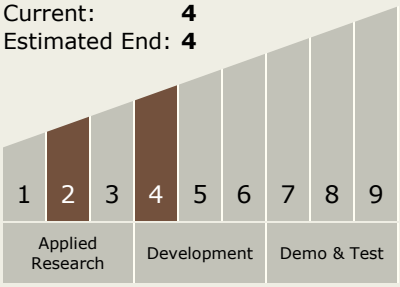
Carlos Torrez

Principal Investigator:

Jarrod Vaillancourt

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System